Bushways

Environmental Services – Tasmania

Flora and Fauna Survey

Ecclestone Road Subdivision

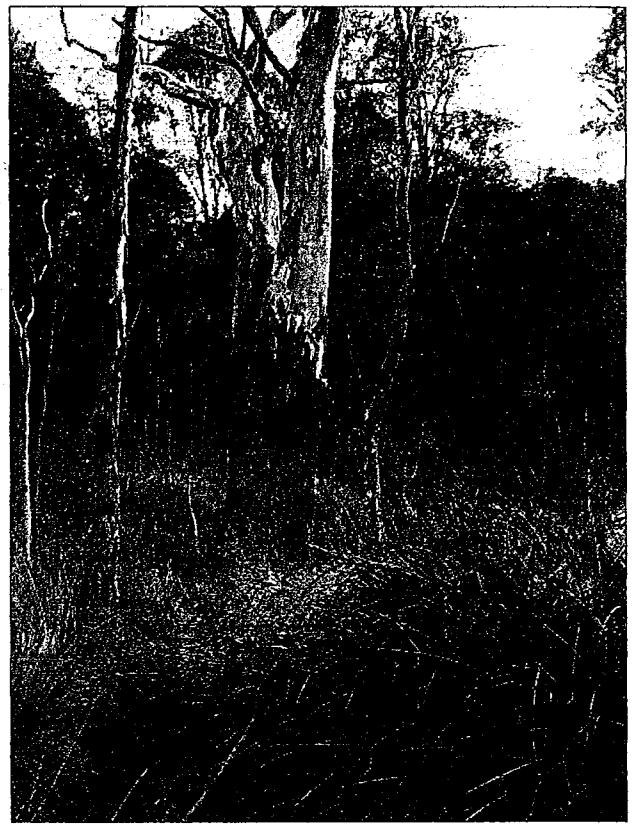

Figure 1. Mature white gum with tree hollow

Provided for Gerry Bonner, Consulting Engineers.

31 July 2005

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Acknowledgements

Bushways thanks the following people who provided assistance or were consulted in the preparation of this report: Felicity Hargraves and Liz Quinn, TASVEG DPIWE and Steve Casey Conservation Assessment Branch DPIWE.

Summary

Gerry Bonner engaged Bushways Environmental Services - Tasmania to carry out a flora and fauna survey as a requirement for the development application for a proposed subdivision on land at Ecclestone Rd. The site is on the northern side of Ecclestone Road, opposite the Rowsphorn Rd junction, approximately 3km west of the West Tamar Highway at Riverside, Launceston.

A residential subdivision is proposed for the site comprising four even sized blocks (approx 0.8ha each) with frontage to Ecclestone Road. A new road is proposed for construction opposite the Rowsphorn Road junction which would pass through this site and the gully to provide access to some of these blocks and a larger second stage residential subdivision to the north of the first subdivision. This road will cut through priority vegetation communities and a wetland/riparian area.

The area surveyed for this report is approximately 3.5 ha of native bush land with a class 4 stream and small wetland area.

Vegetation communities found at the site were Black Peppermint, *Eucalyptus amygdalina,* Woodland on Dolerite (TASVEG Code DAD), White Gum, *Eucalyptus viminalis* grassy woodland (TASVEG Code DVG) and Black gum *E.ovata* woodland (TASVEG Code DOV).

The White Gum Grassy woodland community is listed as vulnerable and under reserved in the bioregion and the Black Gum woodland community is listed as endangered statewide (RFA 1997) and endangered and under-reserved in this bioregion (CARSAG 2003). As such, the management of these forests is constrained by the intent of the conditions of the NHT Bilateral Agreement (translated into the revised administrative instructions to all Forest Practices Officers dated 26 July 2004), which prevents further clearing of Rare, Vulnerable and Endangered vegetation types. The subdivision site is also on "vulnerable land", on which clearing would not generally be permitted in a Forest Practices Plan.

No threatened species were found but it is possible that this is habitat for threatened flora and fauna not found at the time of the survey.

Potential impacts include the direct effects of subdivision and building activity, and longer-term impacts of changed land-use from rural to-residential occupation.

These impacts include loss of endangered and vulnerable vegetation communities, loss of potential threatened flora and fauna habitat, degradation of a wetland and water quality issues, weeds and soil borne pathogens introduced during works, soil erosion and the impacts of residential use.

Recommendations for mitigating impacts include:

1. Protecting the Black Gum and White Gum woodland communities from any clearing or construction activities and avoid constructing access roads and/or driveways through the stream and wetland area.
2. Consulting the Forest Practices Board regarding the legislative mechanisms that have to be addressed considering the conservation status of these communities.
3. Nominate building envelopes on the black peppermint woodland slope and reallocate provision for access roads to avoid high conservation value communities and wetland habitat.
4. Follow best practice sediment and erosion control, weed and pathogen control techniques during works.

1. Introduction

1.1 Background

Gerry Bonner engaged Bushways Environmental Services - Tasmania to carry out a flora and fauna survey as a requirement for the development application for a proposed subdivision on land at Ecclestone Rd.

This report documents the survey and is prepared with reference to the Nature Conservation Branch Brief for Consultants (Lawrence, 2003).

1.2 Description of proposed activity

A residential subdivision is proposed for the site comprising four even sized blocks (approx 0.8ha each) with frontage to Ecclestone Road.

A new road is proposed for construction opposite the Rowsphorn Road junction which would pass through this site and the gully to provide access to some of these blocks and to a larger second stage residential subdivision to the north of the first subdivision.

1.3 Description of the study area

The study area is located at E 506450, N 5414150 and can be found on the Launceston TASMAP 1:25000 sheet 5041. This area is in the Northern Midlands bioregion and the municipality of West Tamar.

The site is on the northern side of Ecclestone Road, opposite the Rowsphorn Rd junction, approximately 3km west of the West Tamar Highway at Riverside, Launceston.

The area surveyed for this report is approximately 3.5 ha of native bush land comprising black peppermint woodland on the south facing slope, white gum grassy woodland on the north facing slope, and black gum woodland on more level ground at the eastern corner of the block.

A class 4 stream runs in a northeasterly direction through the site towards the Tamar River. The riparian area and wetland has dense moisture loving vegetation such as paperbarks and ferns.

The vegetation on the site is in good condition with only a few weeds and there is very little bare ground or erosion at this time.

The drainage on the site varies from well drained to medium and poor drainage and this factor as well as scattered rocky outcrops and plentiful ground litter provide a diversity of habitat areas throughout the site.

Elevation ranges from 150-170m.

2 Survey Methodology

2.1 Background Research

An initial site visit was conducted by Helen Morgan with Gerry Bonner.

A Natural Values Report was conducted through GTSPOT database (20th July) for all threatened flora and fauna records within 5 kilometres of the site, as well as TASVEG communities and candidate areas for the Private Forest Reserves Program.

"Tasmania's Threatened Fauna Handbook" (Bryant & Jackson 1999) was used to identify any other threatened fauna found within the area of the Launceston mapsheet 5041.

2.2 Flora Survey

A survey was carried out by Helen Morgan of Bushways.

Particular attention was paid to the location of threatened species or likely habitat. Field surveys were conducted on the 18th and 20th July 2005.

Ecological vegetation communities were described according to TASVEG2000 classifications. All botanical names are in accordance with the recently updated "A Census of the Vascular Plants of Tasmania" (Buchanan, 2003).

Specimens of native flora, including possible threatened species, were taken for the purpose of identification in accordance with Permit No. TFL 04217 (Threatened Species Unit).

2.3 Fauna Habitat Assessment

Fauna and signs of them were recorded incidentally during the course of the survey. The site was assessed for potential habitat for threatened fauna known to be likely in the area, and the immediate vicinity was scanned for potential eagle nesting sites.

2.4 Limitations

A survey of this type can be expected to identify the vegetation communities and most vascular plant species. However any sampling technique is limited in what can be recorded during one or two visits. Some plant species were not flowering at the time of the surveys (July), making identification of some difficult. Some species vary in abundance from year to year. In particular many orchids emerge in different seasons or sporadically under conditions as yet poorly understood.

Bryophytes and lichens were not surveyed. No threatened lower plants were recorded on GTSPOT as occurring within 5 km.

A full fauna survey was not carried out. However, signs of fauna and any potential habitat for threatened fauna were noted, in case of any potential for disturbance.

2.5 Assessment of Conservation Significance

"Threatened" flora and fauna species are those listed at a state level on schedules 3, 4 or 5 of the *Threatened Species Protection Act 1995*, as well as those listed at a Commonwealth level on the *Environment Protection and Biodiversity Conservation Act 1999*. The term "threatened" or "listed" is

used to cover all of the categories on these schedules, including critically endangered, endangered, vulnerable and rare (and also presumed extinct or extinct in the wild).

The state or bioregional conservation significance of vegetation communities was determined according to:

- Tasmanian Native Non Forest Nature Conservation Priorities (2003), (categorises the bioregional significance of non-forest communities)
- The Supplement to Environment and Heritage Report Vol V of the Tasmania-Commonwealth Regional Forest Agreement (lists RFA forest communities that are endangered, vulnerable and rare statewide.)
- CARSAG (2003) (provides the bioregional conservation status of forests as determined by the Scientific Advisory Group for the Private Forest Reserves Program within DPIWE, 2003).

3 Biological Values

3.1 Vegetation Communities

Vegetation communities found at the site were Black Peppermint, *Eucalyptus amygdalina,* Woodland on Dolerite (TASVEG Code DAD), White Gum, *Eucalyptus viminalis* grassy woodland (TASVEG Code DVG) and Black gum *E.ovata* woodland (TASVEG Code DOV). (Harris and Kitchener 2005).

Species found are listed in appendix 2.

3.1.1 Black Peppermint Woodland on Dolerite (TASVEG Code DAD)

This community is found on the northern side of the gully, covering about 1.2 ha, and is defined by a clear dominance of black peppermint over a mixed grassy and sedgey understorey. Occasional white gums are present in the canopy, especially towards the base of the gully, but the gully really represents the interface of the black peppermint woodland with the other communities here. The eucalypts are scattered and vary in age and maturity with some of the mature trees forming tree hollows.

Silver wattle dominates the sub canopy and small tree layer and is found as the only tree remaining over a proportion of the slope. Black wattle, native cherry and prickly box are also present throughout the community.

A sedgey swathe provides a dense understorey running up the slope from the gully and is dominated by thatch saw sedge (*Gahnia radula)* with scattered clumps and individuals of variable sword sedge and sagg. These sedges are intermingled with low shrubs, ant's delight, native cranberry and creeping bossia; with grasses, mainly silver tussock, wallaby and kangaroo grasses and herbs including native primrose and kidneyweed. Drainage on the slope is fairly poor and there are rocky outcrops providing moist habitat areas for rock ferns, mosses and herbs such as tall sundew and mountain cranesbill. Higher up the slope where it is drier the grasses become the main understorey although the sedges are still present with consistent representation of herbs (buzzies) and ferns such as maidenhair growing underneath.

Fig 2 Black peppermint woodland with sedgey understorey and silver wattle sub canopy.

Eucalypt and acacia seedlings are regenerating throughout the community and there were few weed species. A few individuals of Spanish heath are present and blackberry (mostly as seedlings through the grass or straggling brambles through the sedge) and thistle are common throughout. Some dieback was evident and dodder vine and clematis were climbing over both living and dead trees.

The woodland characteristics of the community now are probably the result of past disturbance such as clearing and fire. Several wallabies were seen and there are tracks, scats and nests evident throughout the community.

There were no threatened species found at the time of the survey but this may be due to the season. Young native lilies were found but are difficult to identify to species level until they are older.

This community is not listed as threatened or as a priority community.

Table 1 Black Peppermint *Eucalyptus amygdalina* Woodland on Dolerite (DAD)- survey summary

Easting: 506344 Northing: 5414263 Accuracy: 7m
Recorder: Helen Morgan Date: 18th July 2005 Altitude: approx. 170m
Geology: Dolerite Rock cover: 20% Landform: gully slopes
Slope: 5-12° Aspect: SE

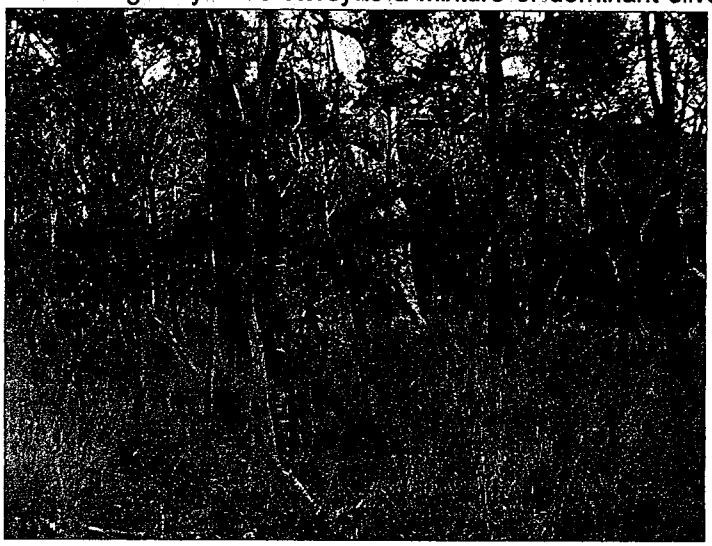
Stratum	Height	Cover %	Characteristic Species
Trees	20-25m	15%	*Eucalyptus amygdalina* *E. viminalis*
Medium Shrubs	5-15m	25%	*Acacia dealbata* *Bursaria spinosa* *Exocarpus cupressiformis*
Low Shrubs	<3m	5%	*Astroloma humifusum* *Hibbertia hirsuta* *Goodenia lanata*
Graminoids	2m	25-80%	*Gahnia radula* *Lepidosperma laterale* *Lomandra longifolia*
Grasses	<2m	30-80%	*Poa labillardiere* *Themeda triandra* *Austrodanthonia spp.*
Herbs	<.5m	5%	*Acaena novae-zelandiae* *Dichondra repens* *Geranium potentilloides*
Ferns	<1m	2%	*Pteridium esculentum* *Polystichum proliferum* *Cheilanthes austrotenuifolia*

3.1.2 White Gum Grassy Woodland (TASVEG Code DVG)

This community is listed as vulnerable and under reserved in the bioregion (CARSAG 2003).

On this site white gum grassy woodland is found on the southern side of the gully near Ecclestone Rd and occupies approximately 1ha of the proposed subdivision. The woodland is clearly dominated by white gums with some black peppermint also in the canopy. A sub canopy dominated by silver wattle, with native cherry and prickly box present is similar here as on the facing slope and there are very few large shrubs. Climbing plants dodder vine, clematis and appleberry were evident on the smaller trees, shrubs and logs scattered throughout the woodland.

The dense grassy understorey is a mixture of dominant silver tussock, wallaby grass and kangaroo grass intermingled with spear grasses and weeping grass and some introduced grasses, fog grass and cocksfoot. There are low shrubs present throughout the grassy layer such as ants delight and native cranberry and herbs, buzzies, kidney weed and woodruff.



This is potentially very good habitat for lilies and possibly the threatened chocolate lilies and blue grasslily. The dense grass may limit their occurrance or it may be too early yet in the season to identify them. Very young lilies were found but were not possible to identify specifically.

Fig 3 White gum grassy woodland

The woodland has been cut over fairly recently with large logs left on the ground and there are signs of fire in the past as well. However, it is in good condition and clearly providing excellent fauna habitat. Several mature white gums are starting to form tree hollows of which some are quite large (See Fig 1 on cover) and possibly large enough for masked owls to use. Echidnas are very active here as evidenced by diggings found and it is possible that some of these smaller shallower digs were bandicoot. A currently used wombat burrow was found in the gully, brush tail possum droppings were noted throughout the community and many wallabies were startled during the survey. Several families of blue wrens were noted in the understorey.

There were some weeds present, notably cotoneaster, quite well established as a large shrub and many seedlings were found. Some garden escapees were also present but not identified, possibly mainland natives. A few gorse plants are growing along the road edge (flowering now) and thistles and blackberries are present throughout the community.

Table 2. *Eucalyptus viminalis* white gum grassy woodland (DVG)- survey summary

Easting: 506347 Northing: 5414168 Accuracy: 7m
Recorder: Helen Morgan Date: 18th July 2005 Altitude: approx. 170m
Geology: dolerite Rock cover: 1-5% Landform: gully slopes and stream
Slope: 5-10° Aspect: NE

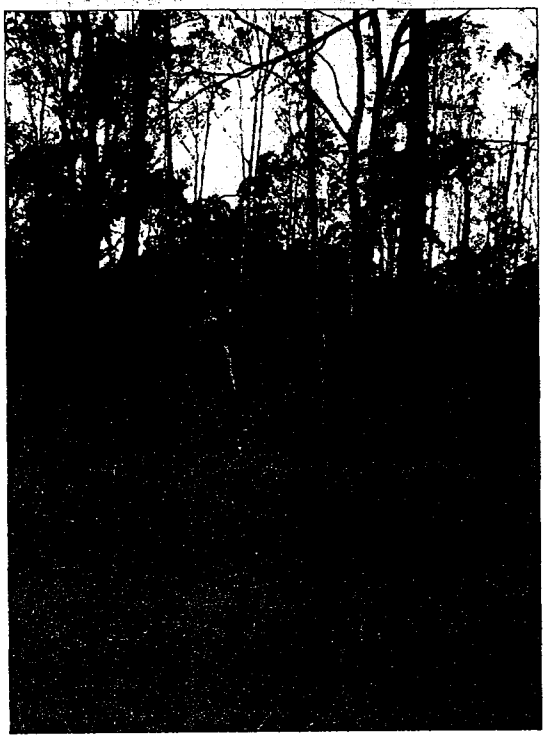
Stratum	Height	Cover %	Characteristic Species
Trees	15-20m	15-20%	*Eucalyptus. viminalis* *E. amygdalina*
Small trees	5-10m	35%	*Acacia dealbata* *Bursaria spinosa* *Exocarpus cupressiformis*
Shrubs	<3m	20%	*Astroloma humifusum* *Cassinia aculeata* *Acrotriche serelata*
Graminoids	<2m	40%	*Lepidosperma enciformi* *Lepidosperma laterale* *Lomandra longifolia*
Grasses	<2m	95%	*Poa labillardiere* *Austrodanthonia spp* *Themeda triandra*
Ferns	3m	5%	*Polystichum proliferum* *Pteridium esculentum* *Blechnum nudum*
Herbs	<.5m	15%	*Acaena novae-zelandiae* *Dichondra repens* *Gonocarpus tetragonus*

3.1.3. Black Gum Woodland (TASVEG Code DOV)

This community is listed as endangered statewide (RFA 1997) and endangered and under-reserved in this bioregion (CARSAG 2003).

Here it covers approximately 1.2 ha of the site.

This community appears to have two distinct parts, one with the black and white gum woodland canopy over a sedgey understorey on the creek flat and the riparian paperbarks with emergent eucalypt canopy over an understorey of ferns and sedges in the creekline.



The woodland has a canopy layer clearly dominated by white gums with some black gums with the occasional black peppermint. There appear to be many trunks for quite a sparse canopy. Most of the trees were young but there were a few mature trees with tree hollows forming. White gums are emergents over paperbark scrub in the riparian area.

The sub canopy is dominated by sliver wattle with native cherry and prickly box also present as small trees on the creek flat and a dense stand of paperbarks dominant in the riparian area. The shrub layer is sparse with dolly bush and dogwood occurring along the riparian edge and scattered individuals through the adjacent creek flat of prickly box, prickly moses and snowy daisy bush.

Thatched saw sedge forms a dense swathe of understorey intermingled with grasses and herbs in the open area and occurs associated with ferns in the understorey of the paperbarks. The dense sedge layer continues up the gully on this side until it reaches an interface with the grassy white gum woodland. On the opposite slope it becomes understorey for the black peppermint woodland.

Fig 4 Black gum woodland with dense sedge understorey

In the main stream channel five crayfish burrows were found (see map) beneath woody debris of fallen paperbark trunks. The stream channel was fairly narrow where water flows over bare ground and small patches of slender tussock grass. Along the channel and throughout the wetland area mothershield fern and fishbone water fern were growing with the occasional soft tree fern.

This community was in good condition with very few weeds or erosion and was evidently good fauna habitat evidenced by the network of runways, several nests, scats and the crayfish burrows. It is possibly a habitat area for threatened moths and butterflies although none of these were found during the survey. (See 3.3)

Fig 5 Riparian vegetation, paperbarks with ferny understorey

Table 2. Black Gum *Eucalyptus ovata* woodland (DOV)- survey summary

Easting: 506448
Recorder: Helen Morgan
Geology: dolerite
Slope: 5°

Northing: 5414303
Date: 18th July 2005
Rock cover: 1%
Aspect: E

Accuracy: 18m
Altitude: approx. 150m
Landform: wetland and creek flat

Stratum	Height	Cover %	Characteristic Species
Trees	15-20m	15-20%	*Eucalyptus. viminalis* *E. ovata* *E. amygdalina*
Small trees	5-12m	40%	*Acacia dealbata* *Melaleuca ericifolia* *Exocarpus cupressiformis*
Shrubs	<3m	5%	*Bursaria spinosa* *Astroloma humifusum* *Acacia verticillata*
Graminoids	2m	20-95%	*Gahnia radula* *Lepidosperma enciformi* *Lepidosperma laterale*
Grasses	1m	25%	*Poa labillardiere* *Ehrharta stipoides* *Poa tenera*
Ferns	3m	2-75%	*Polystichum proliferum* *Pteridium esculentum* *Blechnum nudum*
Herbs	<0.5m	5%	*Acaena novae-zelandiae* *Dichondra repens*

3.2 Plant Species of Conservation Significance

No threatened flora species were found on site. Other threatened flora species that were recorded (GTSpot 5/04) as occurring in the vicinity and were specifically searched for (but not found), are listed in Appendix 3.

Some threatened plants, especially lilies and orchids, may not have been visible at the time of the surveys.

Young lilies were found which may be chocolate lilies or blue grass lily (threatened) or vanilla lilies (not threatened). If it is desirable to confirm the presence of threatened species here then a survey could be carried out in the spring.

3.3 Habitat for Fauna of Conservation Significance

The native vegetation communities, mature trees and understorey on the site provide considerable fauna habitat. Potentially a wide range of fauna, including threatened and otherwise significant species, may use this area and signs such as scats, diggings, nests, runways are numerous.

Threatened species that are likely to occur include:

- masked owl (endangered at state level, *TSP Act 1995*);
- spotted-tailed quoll (rare at state level, *TSP Act 1995*, Vulnerable at national level, *EPBC Act 1999*); and
- eastern barred bandicoot (Vulnerable at a national level, *EPBC Act 1999*)
- broad-striped ghost moth (rare at state level, *TSP Act 1995)*

Bandicoot diggings were found on site but it is not certain whether these are brown bandicoot or eastern barred. There are no recordings of eastern barred bandicoot in this immediate area but this grassy woodland habitat is favourable for them.

Wedge-tailed eagles (endangered at state and national level) hunt overhead, but neither these nor grey goshawks nor sea eagles are likely to nest on site or in the near vicinity.

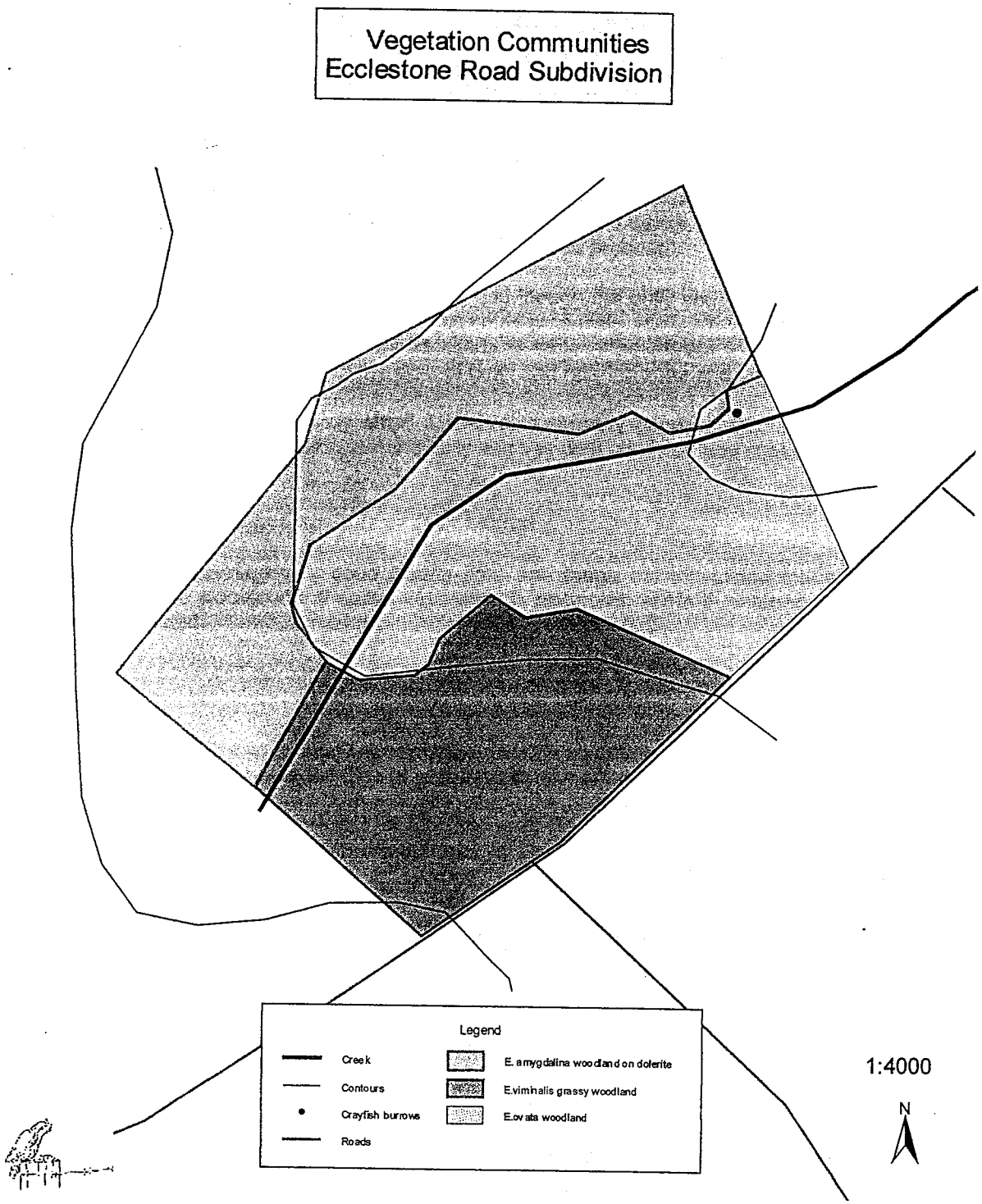
Thatched saw sedge (*Gahnia radula)* is a food plant for the threatened Chaostola skipper, a butterfly recorded in *G. radula* habitat on the east coast (TFNC 1994), and is also possibly habitat for the threatened broad-striped ghost moth, which is recorded from sedge habitat in this area. Both these species are nocturnal and likely to be at the larval stage of their life cycle at the time of the survey (Bryant & Jackson 1999). Their known distribution is limited and it is possible that the vegetation here is providing them with refuge. Information on both these species is limited and confirmation of their presence would require a specific survey in the summer. Thatched saw sedge dominates the ground cover layer over 2.2ha, about two thirds of the site.

The species of conservation significance known or likely to occur are tabled below with comments regarding the likelihood of their occurrence at this site.

Table 3. Threatened fauna likely on site
Species that have been recorded within 5 km of the site, or that may occur in similar habitat on the Launceston mapsheet 5041 (GTSPOT, Bryant & Jackson 1999).
No threatened fauna were recorded on GTSPOT within 500 metres.

Common name	Scientific name	Tas. status TSPA 1995	Cwth status EPBC 1999	Comments
Grey goshawk	*Accipiter novaehollandiae*	e		May occur on site, but limited area of wet forest, so not ideal nesting habitat. Recorded within 5 km.
Wedge tailed eagle	*Aquila audax fleayi*	e		Low slopes, lack of mature trees and proximity to urban areas unlikely to offer ideal sheltered and quiet nesting site. No suitable nest sites visible in immediate vicinity. One individual sighted flying low over area during survey
White bellied sea eagle	*Haliaeetus leucogaster*	v		Not likely to be a nesting site here
Masked owl	*Tyto novaehollandiae castanops*	e		Possible on this site as tree hollows are here and is a good foraging area.
Spotted-tail quoll	*Dasyurus maculatus maculatus*	r	VU	Likely in these forests and foraging on nearby pasture.
Eastern barred bandicoot	*Peremeles gunnii gunnii*		VU	Preferred grassy habitat is here. Bandicoot diggings found on site, could be brown or eastern barred.
Swift parrot	*Lathamus discolor*	e	EN	Not sighted, possible use of this area when migrating as it feeds on black gums.
Green and gold frog	*Litoria raniformis*	v	VU	This site does not have permanent water for breeding but these frogs may be present intermittently.
Spider (cataract gorge)	*Migas plomleyi*	r		Unlikely here as found on moss covered boulders in Cataract Gorge
Australian Grayling	*Prototroctes mareana*	v	VU	Not likely here, too high in the catchment
Hydrobiid snail (cataract gorge)	*Beddomeia launcestonensis*	r		Possible here but not found.
Burrowing crayfish (Mt Arthur)	*Engaeus orramakunna*	r		No records of Mt . Arthur burrowing crayfish west Tamar.5 crayfish borrows were found in the riparian area here, possibly *Engaeus nulloporius.*
Jungermans snail	*Pasmaditta jungermanniae*	r		Unlikely here, found in dense moss on rock faces just above water line in Cataract Gorge
Broad striped ghost moth	*Fraus latistria*	r		Possible here, nocturnal, habitat is sedges and eucalypt woodland such as found here and in the adjacent stage 2 subdivision area. Not found at time of survey.

3.4 Map of Vegetation Communities



4 Potential Impacts of the Proposed Activity

Potential impacts include the direct effects of subdivision and building activity, and longer-term impacts of changed land-use from rural to-residential occupation.

These impacts include loss of endangered and vulnerable vegetation communities, loss of potential threatened flora and fauna habitat, degradation of a wetland and water quality issues, weeds and soil borne pathogens introduced during works, soil erosion and the impacts of residential use.

4.1 Loss of endangered native vegetation communities

Black Gum woodland, endangered statewide and in the region, and White Gum Grassy Woodland, vulnerable in the region, may be damaged or destroyed during road works, fencing and building, if the proposed subdivision and access from Ecclestone Road were to proceed.

The development proposes to construct an access road though the gully and also plans for individual access to the new blocks from Ecclestone Rd. This could potentially allow a number of driveways and crossings of the creek to be constructed and used. Multiple edge effects in a small area would inevitably result in severe degradation to the area of bush and riparian zone and loss of habitat.

Although the area of bush is relatively small it is diverse, in very good condition, provides quality habitat, plays a critical ecological role in water quality and has both aesthetic and conservation value.

4.2 Loss of potential threatened species or their habitat

This site is currently providing very good quality flora and fauna habitat. Listed threatened fauna possibly occur in these woodlands. If native vegetation is disturbed, some threatened and protected animals may be affected.

If the big old trees scattered across the site are removed during works, considerable fauna habitat, especially tree hollows, would be lost.

Although no threatened flora were found the possibility of this site containing threatened flora species should not be ruled out considering the time of year in which the survey was undertaken.

4.3 Degradation of wetland and reduced water quality issues

The wetland and gully is currently providing high quality habitat with large old trees, excellent understorey and a diversity of habitat niches with a range of moisture and shading regimes. Water quality here is good as indicated by the presence of burrowing crayfish.

The proposed construction of creek crossings will impact the riparian and stream ecology and reduce its habitat value by introducing roading which will create multiple edge effects in a small area, and culverts which will channel water and increase flow effects.

It is proposed that storm water would be channeled down this stream, which will increase flow, nutrients and pollutants in the waterway, with a likely increase in erosion and decrease in habitat value. The eroding channel down Ecclestone Road provides a demonstration of the potential for stream erosion here.

Drainage changes to this site would alter downstream water flow and patterns, and by removing the water filtering capacity of this vegetation, probably reduce downstream water quality.

4.4 Weeds and soil-borne pathogens introduced during works

Machinery used for infrastructure development may carry weed seeds and soil-borne pathogens onto the site from elsewhere. This site is already somewhat affected by woody and pasture weeds (including declared weeds under the *Weed Management Act 1999*), which could spread as a result of development.

There is a high likelihood that other declared weeds, not presently on site, could invade during works if machinery, soil or gravel is contaminated. Spanish heath, *Erica lusitanica*, is an extremely invasive declared weed frequently introduced by machinery and roading and occurs on site now.

Pathogens such as phytophthora root rot, *Phytophthora cinnamomi*, and others could potentially be introduced via soil on machinery.

One potential impact of works is weed increase due to attempted rehabilitation of disturbed ground, using introduced species such as lawn grass seed or nursery plants. While this is appropriate in non-native areas, in native grassland or bushland such introduced, often vigorous, species can replace native diversity and add to weed issues.

4.5 Soil erosion

Construction activities carry a risk of soil erosion. At this site there is currently almost total vegetation cover and the slope is mostly gradual although there are steeper parts higher in the gully and on the rockier black peppermint south-facing hillside. If vegetation cover is lost and machinery use introduced the soils here will be vulnerable to erosion, which will impact the native vegetation and the stream with sedimentation and decrease water quality with turbidity and nutrient changes.

4.6 Impacts of residential use

A number of impacts on flora and fauna are possible from residential use:

Clearing, tidying up
Native vegetation may be cleared, excessively mown, or replaced with introduced lawns and garden plants. Old, dead and fallen trees and branches may be "tidied up", removing important habitat. Shrubs and tussocks may be mown or slashed, again removing important shelter. Often these actions are well-intentioned or necessary for hazard reduction (falling limbs, fire hazard).

Burning and fire protection
Residential burning off is a hazard for natural bushland and riparian areas. Repeated small patch burning or "tidying up burning" is likely to impact on the native bush and severely reduce the habitat quality of the riparian area and wetland and poses a risk of escaped burns as well.

Weeds
Introduced garden and lawn plants may spread into nearby bush. Many serious environmental weeds still start life as garden plants. Soil may be brought in for garden beds potentially bringing weeds or soil-borne pathogens. Rubbish and garden clippings may be dumped in the bush, with some becoming weeds.

Existing woody weeds may increase in density if residents do not control them, or decrease if they do.

Fences
Fences may restrict wildlife movement to some extent, although some species will continue to go over or through fences, depending on the type of fence.

Pets and wildlife
Pets such as dogs and cats may affect wildlife numbers by hunting or scaring off birds, bandicoots, quolls and other fauna.

5 Recommendations to Avoid Impacts

5.1 Avoid clearing priority vegetation communities

The Black Gum woodland should not be cleared for roads or buildings. This will help preserve this endangered forest community, as well as the threatened fauna that probably inhabit it. Left intact it will also contribute to continued water quality of the stream, and maintain flora and fauna habitat and corridors in the local landscape.

If the original intention to use the woodland as a residential site were pursued, a Forest Practices Plan would be required. As this is an endangered forest community it is also defined as "vulnerable land", and clearing is unlikely to be approved by the Forest Practices Board, unless an exemption for exceptional circumstances is granted (see 6.3 below). Consult the Forest Practices Board regarding the legislative mechanisms that have to be addressed considering the conservation status of this community.

The white gum grassy woodland, as an endangered vegetation community in the bioregion, has been identified as a conservation priority and is recommended for voluntary conservation (CARSAG 2003). This community also occurs on vulnerable land. Addressing loss of native vegetation is a management priority in the Northern Midlands bioregion (Gouldthorpe & Gilfedder 2002).

Together these communities cover 2.1 ha and would be eligible for a Conservation Covenant. Information regarding covenanting programs (PFRP) Private Forest Reserve Program and Protected Areas on Private Land (PAPL) can be gained from the DPIWE web site.

Nominate building envelopes within the black peppermint woodland on the opposite slope, thus avoiding any damage to the priority communities.

Redesign the proposed access roads and driveways to avoid crossing the riparian and wetland area, the Black Gum woodland, or the white gum grassy woodland, therefore reducing impacts to the wetland, native vegetation, water quality, endangered communities and valuable habitat areas.

5.2 Avoid loss of potential threatened species habitat

Further specific surveys should be conducted if confirmation of threatened species presence is desired.

Avoid any disturbance to high value habitat areas such as the priority vegetation communities, the wetland and the mature trees.

5.3 Avoid disturbing wetland and maintain water quality and avoid soil erosion

If building envelopes were nominated on the northern slope and the access roads were redesigned to enter the subdivision without crossing the wetland area then this whole section of the site could be kept intact.

Techniques to avoid impacting the wetland from upslope activity causing sedimentation and erosion should be adopted during works. These include:

- timing of works with periods of low flow,
- minimising damage to ground cover,
- using the appropriate type and size of machinery,
- keep all machinery out of waterway and on dry and stable areas,
- any runoff from work areas should be directed to sediment traps and
- avoid contaminant spills and treat any spills immediately and responsibly.

5.4 Control weeds and soil-borne pathogens introduced during works

Washdown equipment, machinery and vehicles carefully before entering and leaving the site, to prevent the spread of weeds and soil-borne disease. Washdown guidelines are available from DPIWEwebsite:(http://www.dpiwe.tas.gov.au/inter.nsf/Attachments/LJEM-5ZM43C/$FILE/Washdown%20Guidelines%20Edition%201.pdf)

Remove existing woody and invasive weeds from the site before works, these are few and would be easily dealt with using the cut and paint method, gorse and Spanish heath. Avoid blackberry getting any worse as a result of works by immediate removal of new seedlings. Any removal of weeds near or in the water channel should be done selectively and according to the *Rivercare Guidelines for Herbicide Use Near Water* available from the DPIWE web site.

5.5 Reducing impact of residential use

Appropriate management could mitigate many of the impacts of residential use. Information sheets regarding weed control, habitat areas, pet control etc. could assist future residents to appreciate the natural qualities of their surroundings and guide them in conserving these.

Fire management
Fire hazard must be considered in management of this bushland in such close proximity to an urban area. Local residents could be given information on how to reduce their risk from fire, as should any residents of urban-bush interfaces. Bushways do not advise on fire management; fire management specialists should be consulted for advice. Fire management recommendations for biodiversity given here are taken from existing literature.

Fire management for biodiversity depends on the type of vegetation. The Tasmanian Bushcare Toolkit (Kirkpatrick & Gilfedder 1999) recommends that **fire be excluded from riparian vegetation**. It also recommends that fire should be excluded from paperbark forests while grassy forests need intervals of 6 – 18 years (Kirkpatrick & Gilfedder 1999).

A Building Protection Zone of some 20 to 40 metres around each house is recommended by the Tasmania Fire Service, with a Fuel Modified Buffer Zone of 10 to 50 metres beyond that, managed to reduce flammable material (Tasmania Fire Service pamphlet). Locating houses in building envelopes away from priority vegetation would simplify maintenance of these zones, and reduce the impact of such hazard reduction on the priority vegetation.

Further information on fire management in bushland is available in the Bushcare Toolkit and from the Tasmania Fire Service.

6 Legislative Implications

6.1 Tasmanian Threatened Species Protection Act 1995

A permit would be required from the Threatened Species Unit if threatened species habitat is likely to be destroyed by the development, but no threatened species were identified during this survey. As stated previously in this report, further specific surveys could be conducted if confirmation of threatened species presence is desired.

6.2 Commonwealth Environment Protection and Biodiversity Conservation Act 1999

The Eastern Barred Bandicoot and Spotted-tailed Quoll that may occur on site are listed as Vulnerable under this Act, while Swift Parrots are listed as Endangered. However this subdivision should not require approval from the Federal Environment Minister under this Act, as such a small development in isolation is not likely to have a "significant impact" on the species as a whole. The populations of these species here are probably small, and not likely to be considered "an important population" under the Environment Protection and Biodiversity Conservation Act 1999.

6.3 Tasmanian Forest Practices Act and Regulations 1985, together with the Regional Forest Agreement 1997 and the Bilateral Agreement between the Commonwealth and Tasmania to deliver the extension of the Natural Heritage Trust.

A Forest Practices Plan is required for any forest clearing on non-vulnerable land in excess of 1 hectare or 100 tonnes of timber (whichever is the lesser) per year. On "vulnerable land", in most circumstances a Forest Practices Plan is required for any forest clearing, even less than one hectare.

There is currently a moratorium by the Forest Practices Board on clearing forest communities classified under the Regional Forest Agreement as rare, vulnerable or endangered (Administrative Instruction to all Forest Practices Officers, dated 26 July 2004), such as this endangered Black Gum woodland.

Much of this forest would also classify as "vulnerable land" because it falls within the streamside reserve (10 metres either side of the Class 4 stream channel). The protection of vulnerable land is regarded as a duty of care. Legislative changes as from 1.8.05 mean that rare, vulnerable and endangered forest communities are regarded as vulnerable land from that date. (Steve Casey, pers.comm.)

Clearing will generally not be permitted on vulnerable land.

However, an administrative instruction to all Forest Practices Officers (dated 26 July 2004) states that the Forest Practices Board has the discretion to approve conversion of rare, vulnerable and endangered forest communities in exceptional circumstances, where the conversion will not substantially detract from the conservation of that community or conservation values within the immediate area.

An information sheet from the Forest Practices Board is attached that summarises land clearing legislation.

6.4 Tasmanian Nature Conservation Act 2000 and Wildlife Regulations 1999

Wildlife protected under the Wildlife Regulations no doubt occurs on site, as any native vegetation is likely to be habitat for protected wildlife. A permit may be required, from the Nature Conservation Branch, DPIWE, if protected wildlife are killed or injured, or their products (nests etc) are damaged. However if large habitat trees and logs are avoided and vegetation disturbance is minimized, protected wildlife should not be significantly affected.

6.5 Tasmanian Weed Management Act 1999

Landowners are legally obliged to control weeds declared under the Act, in accordance with management plans that have been written.

Weed Management Plans and other information can be obtained from the website www.dpiwe.tas.gov.au and follow the Quarantine, Pests and Diseases link.

7 References

Bryant, S. L. and Jackson, J. (1999), Tasmania's Threatened Fauna Handbook. Threatened Species Unit, Parks and Wildlife Service, Hobart.

Buchanan, A.M. (2002), A Census of the Vascular Plants of Tasmania, Tasmanian Herbarium website, www.tmag.tas.gov.au/Herbarium/TasVascPlants.pdf

CARSAG (2003). File CARSAG_ forests_Bioregional Simplified Jan 03, from Department of Primary Industries, Water and Environment, Hobart.

Gouldthorpe, J. and Gilfedder, L. (2002). Bioregional Summaries of the Biodiversity Component of the National Land and Water Resources Audit. Nature Conservation Report 02/07. Nature Conservation Branch, Department of Primary Industries, Water and Environment, Tasmania.

GTSPOT, GIS Unit, Land Information Systems Section, Department of Primary Industries, Water and Environment. http://www.gisparks.tas.gov.au/explorer/ValueReports/ValueRequest.html

Guidelines for the Listing of Species under the Tasmanian *Threatened Species Protection Act 1995.* www.dpiwe.tas.gov.au/inter.nsf/Attachments/LBUN-59X7G2?open

Harris, S and Kitchener, A (Eds) (2005) *Tasmania's Vegetation. A Technical manual for TASVEG: Tasmania's Vegetation Map.* Version 1.0. Nature Conservation Branch. DPIWE DRAFT Report (Limited Release).

Harris, S. and Kitchener, A. (2004), Tasmania's Vegetation A Technical Manual for TASVEG: Tasmania's Vegetation Map (Draft). Department of Primary Industries, Water and Environment.

Jones, D., Wapstra, H., Tonelli, P and Harris, S. (1999), The Orchids of Tasmania. Melbourne University Press, Carlton South.

Kirkpatrick, J.B. and Gilfedder, L.A. (1999), Tasmanian Bushcare Toolkit, Department of Primary Industries, Water and Environment, Hobart.

Lawrence, N. (2003), Nature Conservation Branch Brief for Consultants (Draft). Department of Primary Industries, Water and Environment, Hobart.

Supplement to Environment and Heritage Report Vol V of the Tasmania-Commonwealth *Regional Forest Agreement 1997.*

DPIWE (2003), Tasmanian Native Non Forest Nature Conservation Priorities DRAFT, Nature Conservation Branch, Department of Primary Industries, Water and Environment, Tasmania.

TASVEG2000, Tasmanian Vegetation Mapping Strategy, Department of Primary Industries, Water and Environment.

Tasmanian Field Naturalists Club (1994) Butterflies of Tasmania TasFN Club Hobart.

8 Appendices

Appendix 1. Legislation relating to species of conservation significance

The Threatened Species list for Tasmania consists of plants and animals listed under the *Environmental Protection and Biodiversity Conservation Act 1999* at the Commonwealth level and/or listed under the *Tasmanian Threatened Species Protection Act 1995* at the State level.

Tasmanian Threatened Species Protection Act 1995
There are specified criteria and mechanisms for listing and de-listing of taxa under the Tasmanian *Threatened Species Protection Act 1995.* The Minister is responsible for this, but is advised by a Scientific Advisory Committee (S.A.C.). Criteria are described in Guidelines for the Listing of Species under the Tasmanian *Threatened Species Protection Act 1995*[5] . It is an offence to knowingly "take" (including kill or injure) threatened flora or fauna without a permit. Permits may be applied for from the Threatened Species Unit, Department of Primary Industries, Water and Environment.
At the State level, threatened species may be placed in one of four categories that indicate their level of extinction risk. The four categories or risk codes are listed in order of decreasing seriousness:

Extinct (x): Those species presumed extinct.

Endangered (e): Those species in danger of extinction because long-term survival is unlikely while the factors causing them to be endangered continue operating.

Vulnerable (v): Those species likely to become endangered while the factors causing them to become vulnerable continue operating.

Rare (r): Those species with a small population in Tasmania that are at risk.

Commonwealth Environment Protection and Biodiversity Conservation Act 1999
At the Commonwealth level threatened species listed in the *Environment Protection and Biodiversity Conservation Act 1999* may be placed in one of five categories that indicate their level of extinction risk. It is an offence to undertake an action that will have a significant impact on listed threatened species or communities without approval or exemption from the federal Environment Minister. A process is defined for applying for approval.
The five categories or risk codes are listed in order of decreasing seriousness:

Extinct (EX): Where a species has not definitely been located in the wild for the past 50 years.

Extinct In The Wild (EW): This is when a species cannot be found living in the wild despite exhaustive surveys, but is still known to exist in captivity. At present we do not have any in this category in Tasmania.

Critically Endangered (CR): In this case a species is in extreme danger of becoming extinct in the immediate future.
Endangered (EN): A species at very high risk of becoming extinct in the near future.
Vulnerable (VU): A species is facing a high risk of extinction in the medium term future.

Tasmanian Regional Forest Agreement 1997
Priority Species Requiring Consideration, are listed in Attachment 2 of the *Tasmanian Regional Forest Agreement 1997.* The list includes threatened species, species protected through other mechanisms (such as the Forest Practices Code) and others requiring further research to determine requirement for protection. For instance, the list includes hollow dependent species.

Tasmanian *Wildlife Regulations 1999* (*Nature Conservation Act 2002*)
Protected wildlife (currently fauna species only) is listed on Schedules 1, 2, 3 and 4. Note that these schedules also list threatened species from other states, and are updated less frequently than the schedules in the *Threatened Species Protection Act 1995.* It is illegal to "take" (including kill or injure) protected wildlife or their products (nests, burrows, etc), unless authorized by a permit or licence.

Permits may be applied for from the Nature Conservation Branch, Department of Primary Industries, Water and Environment.

Tasmanian *Forest Practices Act 1985* and *Regulations*

Attached is a Forest Practices Board information sheet that describes the changes to legislation affecting land clearing under this Act.

Appendix 2. Vascular Flora Species List – *Flora species found on site,*
Survey conducted 18th July 2005.

Key:
i = introduced and naturalised in Tasmania; eT= endemic in Tasmania
Threatened species in bold-
Tasmanian status (*Threatened Species Protection Act 1995*):
en = Endangered; x = Presumed Extinct; v = Vulnerable; r = Rare
Commonwealth status (*Environment Protection and Biodiversity Conservation Act 1999*):
EX = extinct; CR = Critically Endangered; EN = Endangered; VU = Vulnerable.

Family	Species name	Common name	Status
NATIVE BROAD-LEAFED PLANTS (DICOTYLEDONAE)			
MYRTACEAE	*Eucalyptus amygdalina*	Black Peppermint	eT
	Eucalyptus viminalis	White Gum	
	Melaleuca ericifolia	Swamp Paperbark	
ASTERACEAE	*Cassinia aculeata*	Dolly Bush	
	Cirsium vulgare	Spear Thistle	i
	Euchiton collinus	Common cotton leaf	
	Hypochoeris radicata	Flatweed	i
	Lagenophora stipitata	Blue Bottle Daisy	
	Solonogyne dominii		
	Olearia lirata	Daisy bush	
CLUSIACEAE	*Hypericum japonicum*	St John's wort	
CONVOLVULACEAE	*Dichondra repens*	Kidneyweed	
DILLENIACEAE	*Hibbertia hirsuta*	Hairy Guinea-flower	
DROCERACEAE	*Drocera peltata*	Tall sundew	
ERICACEAE	*Erica lusitanica*	Spanish Heath	i
EPACRIDACEAE	*Acrotriche serrulata*	Ants Delight	
	Astroloma humifusum	Native Cranberry	
FABACEAE	*Bossia prostrata*	Creeping bossia	
GENTIANACEAE	*Centaurium sp.*	Common Centaury	i
GERANIACEA	*Geranium potentilloides*	Mountain cranesbill	
GOODENIACEAE	*Goodenia lanata*	Native Primrose	
HALORAGACEAE	*Gonocarpus tetragynus*	Common Raspwort	
LAURACEAE	*Cassytha melantha*	Large dodder-laurel	
MIMOSACEAE	*Acacia dealbata*	Silver Wattle	
	Acacia verticillata	Prickly Moses	
	Acacia melanoxylon	Blackwood	
	Acacia mearnsii	Black wattle	
OXALIDACEAE	*Oxalis perennans*	Native Oxalis	
PITTOSPORACEAE	*Bursaria spinosa*	Prickly Box	
	Billardiediera scandens	Common appleberry	
RANUNCULACEAE	*Clematis aristata*	Native Clematis	
	Clematis microphylla	Small leaf clematis	
RHAMNACEAE	*Pomaderris apetala*	Dogwood	
ROSACEAE	*Acaena novae-zelandiae*	Buzzy	
	Acaena echinata	Spiny Sheep's Burr	
	Rubus fruticosus agg.	Blackberry	i
	Cotoneaster sp	Cotoneaster	i
	Rubus parvifolius	Native Raspberry	
RUBIACEAE	*Coprosma quadrifida*	Native currant	
	Asperula conferta	Common woodruff	
	Opercularia ovata	Broad stinkweed	
SANTALACEAE	*Exocarpos cupressiformis*	Native Cherry	

SCROPHULARIACEAE	*Veronica calycina*	Hairy speedwell	
VIOLACEAE	*Viola hederaceae*	Ivy leaf violet	
	Hymenanthera dentata	Spiky tree violet	
NARROW-LEAFED PLANTS (MONOCOTYLEDONAE)			
CYPERACEAE	*Carex breviculmis*	Sedge	
	Lepidosperma ensiforme	Two-handed Sword-sedge	
	Lepidosperma laterale	Variable sword sedge	
	Gahnia radula	Thatched saw sedge	
	Schoenus absconditus	Hidden bog sedge	
JUNCACEAE	*Juncos procera*	Great rush	
LILIACEAE	*Arthrodpodium sp ?*	Lily	
POACEAE	*Austrostipa sp*	Spear grass	
	Austrodanthonia spp.	Wallaby Grasses	
	Ehrharta distichophylla	Hairy Rice-grass	
	Ehrdarta stipoides	Weeping grass	
	Poa hookeri	Hookers poa grass	
	Poa tenera	Slender tussock grass	
	Poa rodwayi	Rodways poa grass	
	Poa labillardierei	Tussock Grass	
	Themeda triandra	Kangaroo Grass	i
	Briza maxima	Quaking grass	i
	Holcus lanatus	Cocksfoot	i
XANTHORRHOEACEAE	*Lomandra longifolia*	Sagg	
FERNS (PTERIDOPHYTA)			
ADIANTACEAE	*Adiantum aethiopicum*	Common Maidenhair	
	Cheilanthes austrotenuifolia	Rock fern	
ASPIDIACEAE	*Polystichum proliferum*	Mother Shield-fern	
ASPLENIACEAE	*Asplenium flabellifolium*	Necklace Fern	
BLECHNACEAE	*Blechnum nudum*	Fishbone water fern	
DENNSTAEDTIACEAE	*Pteridium esculentum*	Bracken	
DICKSONIACEAE	*Dicksonia Antarctica*	Soft tree fern	

Appendix 3. Threatened flora previously recorded within 5 km of site.
(GTSPOT, July 2005). All were specifically searched for, and none were found. Some, such as orchids, may not have been visible at the time of the surveys.

Key:
Species found on site in bold.
Tasmanian status (*Threatened Species Protection Act 1995*):
en = Endangered; x = Presumed Extinct; v = Vulnerable; r = Rare
Commonwealth status (*Environment Protection and Biodiversity Conservation Act 1999*):
EX = extinct; CR = Critically Endangered; EN = Endangered; VU = Vulnerable.

Scientific name	Common name	Conservation Status		Comments
		State	Cwth	
Alternanthera denticulata	Lesser joyweed	e		Likely here but not found
Anogramma leptophylla	Annual fern	r		Possible but not found
Aphelia gracillis	Slender aphelia	r		Possible here but not found
Aphelia pumilio	Dwarf aphelia	r		Possible here but not found
Arthropodium strictum	Chocolate lily	r		Very likely here, young lilies sampled but not positively identified
Bolboschoenus calswellii	Sea club rush	r		Not likely, found in shallow brackish water
Bolboschoenus medianus	Marsh club rush	r		Not likely, found in lagoons
Xerochrysum bicolor	White alpine everlasting	r		Not likely, found in heathland habitat
Brunonia australia	Blue pincushion	v		Possible but may not like strong grass competition
Caesia calliantha	Blue grass lily	r		Likely but not found
Callitris ooblonga oblonga	South Esk Pine	v	EN	Unlikely
Calystegia sepium	Great bindweed	r		Possible but not found
Carex gaudichaudiana		pl		Possible but not found
Carex longebrachiata	Drooping sedge	r		Possible but not found
Centipeda cunninghamii	Common sneezeweed	r		Possible but not found
Chiloglottis trapeziformis	Broad-lip bird orchid	e		Possible but not found
Cynoglossum australe	Australian hounds tongue	r		Possible but not found
Discaria pubescens	Hairy anchor plant	e		Possible but not found
Diuris palustris	Swamp diuris	e		Possible but not found
Doodia caudata	Small rasp fern	v		Possible but not found
Epacris exserta	South esk heath	v	EN	Unliikely and not found
Gravillea australis linearfolia	Narrow leaf southern grevillea	r		Possible but not found
Gyrostemon thesioides	Broom wheel fruit	r		Unlikely, prefers she oak forest

Hypolepis muelleri	Harsh ground fern	r		Possible but not found
Hypoxis vaginata brevistigmata	Sheathing yellow star	pl		Possible but not found
Juncus amibilis	Gentle rush	r		Possible but not found
Lycopus australis	Native gypsywwort	e		Possible but not found
Lythrum salicaria	Purple loosestrife	v		Possible but not found
Myriophyllum integrifolium	Tiny water milfoil	v		Possible but not found
Persecaria decipiens	Slender knotweed	v		Possible but not found
Persecaria subsesssilis	Bristly knotweed	e		Possible but not found
Poa mollis	Soft poa grass	r		Possible but not found
Prostanthera rotundifolia	Round leaf mint bush	v		Unlikely prefers wet forests
Ranunculus sessiliflorus sessiliflorus	Annual buttercup	r		Possible but not found
Rurnex bidens	Mud dock	r		Unlikely needs standing water
Schoenoplectus validus	River club sedge	r		Unlikely
Scutellaria humilis	Dwarf scullcap	r		Possible but not found
Spyridium vexilliferum	Winged spyridium	r		Unlikely
Velleia paradoxa	Spur velleia	v		Possible but not found
Veronica plebeia	Trailing speedwell	r		Possible but not found
Viola caleyana		r		Possible but not found